NISTTech

NON-DESTRUCTIVE METHOD FOR DETERMINING THE EXTENT OF CURE OF A POLYMERIZING MATERIAL AND THE SOLIDIFICATION OF A THERMOPLASTIC POLYMER BASED ON WAVELENGTH SHIFT OF FLUORESCENCE

Abstract

The change in the peak fluorescence wavelength of a small amount of a fluorescent compound, i.e., a fluorophore, which has been dissolved in a polymerizing material or a thermoplastic polymer is used to determine the extent of cure or solidification, respectively. The measured wavelength-shift can either be compared with a previously determined correlation to obtain an absolute value for the extent of cure, or can be utilized to compare or maintain an acceptable extent of cure throughout a manufacturing or a clinical process. Similarly, in the processing of a thermoplastic polymer by injection molding, the measured wavelength shift can either be compared with a previously determined correlation to obtain an absolute value for the temperature of the polymer, or can be utilized to adjust the injection molding cycle so that the mold is opened at the optimum times. The fluorophores used in the method are preferably selected from a class of fluorophores comprising alpha, omega substituted linear alkenes having an electron accepting group attached at the alpha position and an electron donating group attached at the omega position.

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References

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Status of Availability

This invention is available for exclusive or non-exclusive commercialization licensing. Collaborative research opportunities are available.

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